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IS 15776 (2008): Polyurethane (PU) coated leather [CHD 17: Leather, Tanning Materials and Allied Products]

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पॉलियुरिथेन (पीयू) की परत वाला चमड़ा — विशिष्टि

Indian Standard

POLYURETHANE (PU) COATED LEATHER — SPECIFICATION

ICS 25.220.01; 59.140.30; 83.080.10

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BUREAU OF INDIAN STANDARDS
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NEW DELHI 110002

April 2008

Price Group 3

Leather, Tanning Materials and Allied Products Sectional Committee, CHD 17

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Leather, Tanning Materials and Allied Products Sectional Committee had been approved by the Chemical Division Council.

Polyurethane (PU) coated leather is used widely in the manufacture of various leather goods items, leather footwear and leather garments in view of unique appearance. Additionally, leather even with severe grain damage can get upgraded by polyurethane coating wherein the surface defects get masked.

Polyurethane (PU) coated leathers also find a strong demand in the fashion industry and thereby have international demand.

The composition of the Committee responsible for formulation of this standard is given in Annex D.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

POLYURETHANE (PU) COATED LEATHER — SPECIFICATION

1 SCOPE

This standard prescribes requirements, methods of sampling and test for polyurethane (PU) coated leather.

2 REFERENCES

The following standards contain provisions, which through reference in this text constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS No.	*Title*
576 : 1989	Leather — Glace kid for shoe uppers — Specification.
582 : 1970	Method of chemical testing of leather (*first revision*)
1070 : 1992	Reagent grade water (*third revision*)
1640 : 1960	Glossary of terms relating to hides, skins and leather (*first revision*)
5868 : 1983	Method of sampling for leather (*first revision*)
5914 : 1970	Methods of physical testing of leather
6191 : 1971	Methods of microbiological, colour fastness and microscopical tests for leather
12659 : 1989	Method of test for measurement of thickness of surface coating on leather
12718 : 1989	Leather for garments — Performance requirements
14575 : 1999	Determination of pentachlorophenol (PCP) in leather—Method of text
14898 : 2001	ECO criteria for finished leather — Specification

3 TERMINOLOGY

For the purpose of this standard the definitions given in IS 1640 shall apply.

4 REQUIREMENTS

4.1 General

The leather shall be full-chrome or semi-chrome/chrome retanned with vegetable tannins/syntans. The grain may be snuffed, if required. The grain side of the leather shall be finished with a film of polyurethane and shall have a high gloss as agreed to between the purchaser and the supplier.

4.2 Physical and Chemical Requirements

The leather shall also conform to the requirements given in Table 1, when tested in accordance with the methods prescribed in col 4 of Table 1.

4.3 Hazardous Chemicals

The leather shall also conform to the requirements given in Table 2, when tested in accordance with the methods prescribed in col 4 of Table 2.

5 MARKING

5.1 The leather shall be legibly marked on the flesh side of each piece with the area in square decimeters, with the following details:

a) Batch No.,
b) Date of finishing, and
c) Identification mark or source of manufacture.

5.2 In addition, the leather when packed in a bundle, shall be marked with the total area of the leather in that bundle and number of total pieces of leather in the same.

5.3 BIS Certification Marking

The product may also be marked with Standard Mark.

5.3.1 The use of the Standard Mark is governed by the provisions of *Bureau of Indian Standards Act,* 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

6 PACKING

The leather shall be packed as agreed to between the purchaser and the supplier.

7 SAMPLING

Representative samples of the material shall be drawn and tested for their conformity with the requirements of this standard in accordance with the method of sampling prescribed in IS 5868.

Table 1 Physical Requirements for PU Coated Leather

(*Clause* 4.2)

Sl No.	Characteristic	Requirement	Method of Test, Ref to			
			IS 582	IS 5914	IS 6191	IS 2659
(1)	(2)	(3)	(4)	(5)	(6)	(7)
i)	PU fim thickness, microns, *Min*	15	—	—	—	IS 12659
ii)	Tensile strength, MPa, *Min*	16	—	LP 6	—	—
iii)	Elongation at break, percent, *Max*	80	—	LP 6	—	—
iv)	Double hole stitch tear strength, N/cm, *Min*	800	—	LP 8	—	—
v)	Tear strength, N/mm, *Min*	300	—	LP 7	—	—
vi)	Flexural endurance, Flexes, *Min*:					
	a) Dry	20 000	—	LP 19	—	—
	b) Wet	10 000	—	LP 19	—	—
vii)	Fastness to rubbing after 1 024 revolutions, *Min* Grey scale rating:					
	a) Dry	4	—	—	LF 9	—
	b) Wet	4	—	—	LF 9	—
viii)	Finish adhesion, N/m, dry, *Min*	250	—	—	—	Annex D of IS 12718
ix)	Distention at grain crack, mm, *Min* (The sound of crack is to be observed instead of visual observance of crack)	7	—	—	—	Annex A of IS 576
x)	Cold crack resistance	No crack at −10°C	—	—	—	Annex E of IS 12718
xi)	Acetone peel test	To pass the test	—	—	—	Annex A of this standard
xii)	Hot scrape test, at 250°C	To pass the test	—	—	—	Annex B of this standard
xiii)	Toggle test	To pass the test	—	—	—	Annex C of this standard
xiv)	Solvent extractable substance, percent by mass, percent[1]	3 to 8	LC 4	—	—	—
xv)	Chromium (as Cr_2O_3), percent by mass, *Min*[1]	2.0	LC 10	—	—	—
xvi)	Water solubles, percent by mass, *Max*[1]	3.5	LC 6	—	—	—
xvii)	*p*H of aqueous extract, *Min*	3.5	LC 18	—	—	—
xviii)	Differential figure	Not greater than 0.7	LC 18	—	—	—

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[1] To be calculated on zero percent moisture basis.

Table 2 Freedom from Hazardous Chemicals

(*Clause* 4.3)

Sl No.	Characteristic	Requirement	Method of Test, Ref to
(1)	(2)	(3)	(4)
i)	Formaldehyde, mg/kg, *Max*	150	LC : 3 of IS 14898
ii)	Pentachlorophenol, mg/kg, *Max*	5	IS 14575
iii)	Coupled amines released from azo dyes (sum parameters), mg/kg, *Max*	30	LC : 4 of IS 14898
iv)	Hexavalent chromium, mg/kg, *Max*	3	LC : 2 of IS 14898

ANNEX A

(*Table* 1)

ACETONE PEEL TEST

A-1 PRINCIPLE

In order to check the bond strength between the PU film and the leather, acetone is applied on the flesh side of the leather and the film is peeled off.

A-2 PROCEDURE

Cut two test specimens with 100 mm × 10 mm size on both directions. Apply 1 ml of acetone on the flesh side at one end of the test specimen. Place the leather on a table with PU coated side up. Leave it for 5 min. Make a light vertical cut on acetone applied area of the film with the help of a knife. Gently take off the film from the leather and peel the film up to the dry section holding the sample between the fingers. Repeat the entire procedure for the second sample. If the film is detached easily the sample is considered to be failing.

A-3 EXPRESSION OF RESULTS

Based on the visual examination, the results shall be expressed in either of the following two terms:

a) Passes the test, and

b) Fails the test.

ANNEX B

(*Table* 1)

HOT SCRAPE TEST

B-1 PRINCIPLE

The test is intended to determine the resistance of the finish surface to mechanical damage after short-term contact with a hot surface.

B-2 APPARATUS AND MATERIALS

B-2.1 Heat resistance tester having the following features:

a) A copper bit having a mass of 2 ± 0.5 N with a circular surface area of 650 ± 50 mm^2 and provision to measure temperature.

b) A metal heating block with a mass of 5.3 ± 0.5 N, fitted around the vertical sides of the copper bit with provision of a heater which can be controlled to heat the lower surface of the bit to any desired temperature up to a maximum of 250°C.

c) A temperature measuring device to measure the temperature up to 250°C to the nearest 2°C.

d) A lower metal platform, which is self-aligning with the lower surface of the bit and is larger than the lower surface of the bit.

e) A removable thermally insulated support to hold the bit clear of the platform.

f) A means for raising the bit clear of the support and bringing it into uniform contact with the test specimen mounted on the platform under a pressure of 20 ± 2 kPa.

B-2.2 Scraping Tool — A blade of dimensions as shown in Fig. 1.

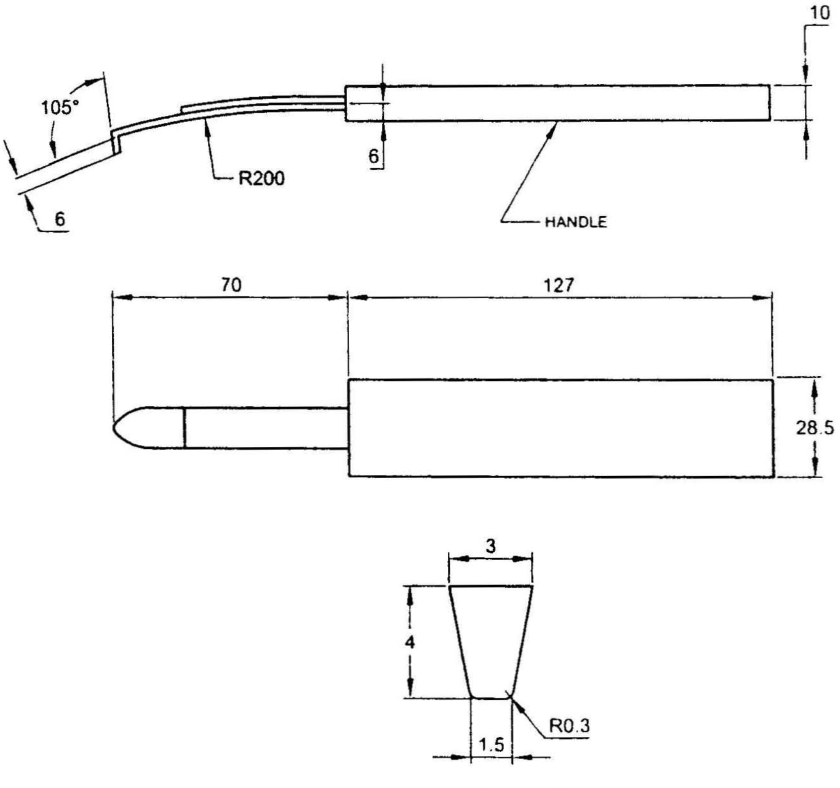
B-2.3 Timer, to measure the time to the nearest 1s.

B-3 PROCEDURE

a) Cut a test specimen large enough to handle for the test.

b) Switch on the heating source of the test machine and wait until the temperature in the indicator is slightly above 250°C and switch off the machine.

c) Place the leather piece on the platform with finish side facing up and place an aluminium



All dimensions in millimetres.

FIG. 1 SCRAPING TOOL

sheet/foil over the leather.

NOTE — Aluminium sheet is used to avoid any sticking of the film to the heating bit.

d) When the temperature reaches 250°C, lower the lever so that the heating bit comes in contact with the finish on the leather.

e) After 30 ± 1 s, raise the platform and quickly remove the leather from the platform and place it on the table.

f) Immediately scrape the finish surface with one stroke using the scraping tool in one direction approximately applying 9 ± 1 N force by hand. Repeat this scraping procedure at two more places adjacent to the scraped surface.

g) Entire test should be conducted quickly before the surface gets cooled.

B-4 REPORT

Based on the visual examination, the results shall be expressed in either of the following two terms:

a) Passes the test, and

b) Fails the test.

ANNEX C

(*Table* 1)

TOGGLE TEST

C-1 PRINCIPLE

In order to check the property for resistance to cut growth of the PU film, the patent leather is aged at a higher temperature for a certain period and it is then visually examined.

C-2 APPARATUS

C-2.1 Toggle Board

C-2.2 Toggle Clips

C-2.3 Air Oven, maintained at 100 ± 2°C.

C-3 PROCEDURE

Cut 100 mm × 15 mm strip of test piece from the sample of PU leather. Make few holes on the specimen with the help of a nail at regular intervals. Stretch the leather using toggle clips and keep the stretched leather in an oven maintained at 100 ± 2°C for 24 h. Remove the stretched leather from the oven after 24 h and cool it at room temperature.

C-4 EXPRESSION OF RESULT

Based on the visual examination of the specimen the result is expressed in either of the following terms:

a) *Passes the Test* — In case there is no crack or tear growth or change in colour of the PU film, and

b) *Fails the Test* — In case there is a crack or tear growth or change in colour of the PU film.

ANNEX D

(*Foreword*)

COMMITTEE COMPOSITION

Leather, Tanning Materials and Allied Products Sectional Committee, CHD 17

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